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# Schooling and the Intergenerational Transmission of Values

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## Abstract

We present a model of the evolution of identity via dynamic interaction between the choice of education and the transmission of values in a community from parents to children, when parents care about the preservation of their traditional community values, different from the values of the host society. We compare the educational and socio-economic outcomes in different scenarios (melting pot versus multiculturalism). If schooling shifts children's identity away from their parents' values parents may choose lower levels of education for their children, at the cost of reducing their future earnings. We show how this effect can be attenuated and reversed when the school or, indeed, the host society are willing to accommodate the values of the community and/or to adjust to these values; otherwise the community gradually becomes alienated. This approach may be applied to the analysis of temporal changes in values and attitudes in a community of immigrants, as well as ethnic, religious, or other minority groups.

*Key words:* values, education policies, overlapping generations.

*JEL classification numbers:* I20, J15, H8

## 1 Introduction

Immigration has featured as an increasingly important political issue in European debates over the past two decades, and the integration of migrants into their host societies is a subject raising anxieties both in the recipient countries

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and amongst the migrants themselves. One of the most important channels for integration is the schooling process. In the United Kingdom, nearly three quarters of teachers (72%) regard the promotion of British values as part of a teacher's role, with one in five teachers (21%) seeing this as a central part.<sup>1</sup> This is despite the fact that the poll found that there were a significant proportion of teachers (36%) who did not identify strongly as being British.<sup>2</sup> For many immigrant communities the consequence of schooling is that their values and the values of the host society gradually converge over time until the community is assimilated within the host. One remarkable example is the history of the Jewish community that developed in the East End of London from 1880 onwards. Approximately 120,000 immigrants from Eastern Europe settled in Spitalfields between 1881 and 1914 with the concentration such that the population of some districts was up to 95 per cent Jewish; the area had over 40 synagogues, and Yiddish was the predominant language on street signs and in newspapers. However, according to the Board of Trade report of 1894, "children left the Jews' Free School on Bell Lane 'almost indistinguishable' from English children. Religious rituals also gradually became less distinctive, and fewer people spoke Yiddish."<sup>3</sup> This once large, vibrant and distinctive community has now been entirely absorbed into British society and, in the East End, only the historical record remains.

This paper models how the values of the host society, promoted by the system of education, and the values of a migrant community interact in shaping the identity of the new generation of the community members. The analysis shows how values change across generations when children's values are shaped both by their families and their schooling, so that the reference norms for each new generation can be different from those of the previous one. We trace the dynamic interaction between the values and show when the process will lead to either assimilation of the community or lasting separation between the community and the host society. The important policy conclusion is that separation results from the education of community children being restricted by their parents to prevent or minimize exposure to host society values. This leaves the community in a permanently disadvantaged economic position due to the low level of education that is chosen.

There exists a large literature looking at the social and economic position of migrants and their children in Europe and North America (for a comprehensive review see Corak, 2004; and for a recent study of the Canadian case see Aydemir *et al.*, 2009, 2013). The common finding is that some socioeconomic outcomes are transmitted from immigrant parents to their children, though convergence to host society outcomes also occurs over time. For example, Blau *et al.* (2008)

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<sup>1</sup>Data from YouGov research, commissioned by Teachers TV.

<sup>2</sup>Press release of Teachers TV published online (<http://www.teachers.tv/node/29223>). Research was conducted online by YouGov Plc between 17th and 22nd September 2008. YouGov interviewed 643 primary and secondary school teachers. Results have not been weighted. YouGov is a member of the British Polling Council.

<sup>3</sup>[http://www.bbc.co.uk/legacies/immig\\_emig/england/london/article\\_2.shtml](http://www.bbc.co.uk/legacies/immig_emig/england/london/article_2.shtml). Accessed on April 17, 2014.

found that after two generations education and labour supply of immigrants converge to those of the host population (between 4% and 13% of education and between 3% and 4% of labour supply shortfall); fertility, however, shows more persistence (between 16% and 42% of excess fertility remains).

Research on the evolution of ethnic identity by immigrants shows that values are important to the process of creating an ethnic identity and the latter is then an important determinant of economic choices. Constant *et al.* (2009) define ethnic identity as ‘*the balance between commitment or self-identification with the culture and society of origin and commitment or self-identification with the host culture and society, achieved by an individual after migration*’ (p. 276), and discuss possible outcomes of the process in terms of assimilation (cultural and social conformity), integration (strong identification with ethnic culture and social conformity to host society), marginalization (weak cultural identification and weak social conformity), and separation (strong identification to culture of origin and weak involvement in host society). Reese (2001) discusses the adaptive struggle faced by Mexican immigrants in the United States trying to raise children who would do well economically but not fall prey to the ‘moral dangers’ of the host society. These processes are not uniform across immigrant communities and depend on a variety of factors, including children’s gender: Patel *et al.* (1996), for example, show for the case of Gujarati immigrant families in the US that parental attitudes and behavior are affected differently by factors such as modernity, acculturation, and time in the US, depending on parent’s and child’s gender.

These findings, and similar findings in the sociological and economic literature, provide evidence of a process of values transmission across generations, influenced by the values of the host society and mediated by various policy channels addressing social inclusion. In this paper we concentrate on the effect of education, and, in particular, on the mitigation of the degree of conformity with school norms by the conformity with community norms (a reflection of the ethnic and social mix of the neighborhood of residence). In our model the frame of reference for each generation are the norms of their parents and those of the host society. Social norms and values have long featured in explanations of individual and group behavior by economists since the early work on social norms and conformism by Akerlof (1980) and Jones (1984). At the same time, the role of identity in individual welfare and decision-making has only relatively recently featured in economic models. Our approach falls within the tradition of the economics of social norms and identity (Akerlof and Kranton, 2000) in which norms act as motivating devices and the inherent sociability of humans creates a loss of utility from not conforming with the prevailing norms. The key assumption in our model is of two-way interaction of values between a minority community and the host society. This interaction occurs through the system of education, so that the evolution of values over time is determined endogenously. This is in contrast to the approach introduced by Bisin and Verdier (2001) and developed, for example, in Saez-Marti and Sjogren (2008) and Corneo and Jeanne (2009, 2010), who model the evolution of values as a random process with exogenously fixed probability distribution. Dasgupta and Kanbur

(2005, 2007) consider a similar interaction between the values of two coexisting communities. In their framework values are modelled as a local public good, with members of the community affecting them directly by choosing their contributions towards its provision. In our model the behavior of agents affects the values indirectly, through the choice of education.

In the next section we present our model of educational choice and characterize the potential steady state equilibria. Section 3 explores multiplicity of equilibria in more detail using numerical simulations. In Section 4 we discuss the policy implications of the results and provide conclusions. All proofs are in the Appendix.

## 2 The Model

Consider a community of  $n$  families whose traditional values differ from the values of the host society outside the community. This could, for example, be a community of immigrants or a religious minority. To analyze the dynamics of the community values when new generations are exposed to the external society values through the education process we use a two-period overlapping generations model. Schooling is received in the first period of life, and in the second period each adult works. Each adult has only one child, and so there is no population growth.<sup>4</sup> Earnings depend on education received, and are divided between consumption and investment in the education of the child. There is intergenerational altruism which motivates the provision of education; there are no bequests.

In the first period of life each individual receives education with the amount chosen by their parent. There is a minimal level of education, or basic skills, that can be obtained by home schooling at no cost; without loss of generality we normalize it to zero. Any formal education beyond this minimal level has a material cost. In the second period each individual works and divides their earnings between consumption and investment in education of their offspring. The formal education system is maintained by the host society and performs two roles: an academic role and a social role. In the academic role education enhances a student's skills and, therefore, increases his or her future labour earnings. In the social role it promotes the values of the host society and, therefore, affects the identity of a student. Parents care about their offsprings' future wealth, as well as about preserving traditional values of the community. In particular, they dislike their children's values deviating from the values currently prevailing in the community.

The adult member of family  $i$  at time  $t$  has values given by  $\theta_t^i$ . The parameter  $\theta_t^i$  can be interpreted as an aggregate of a number of factors (for example, respect for elderly, status of women, tolerance to pre-marital relationships, religiosity). The community mean value is the mean of the values of the adults alive at time

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<sup>4</sup>Population growth is a relevant issue since the effect of a community of social values can be influenced by its relative size. We leave analysis of that possibility to later work.

$t$

$$\theta_t^C = \frac{1}{n} \sum_{i=1}^n \theta_t^i. \quad (1)$$

The preferences of adult  $i$  at time  $t$  are described by

$$U_t^i = u(x_t^i) + v(w_{t+1}^i) - g\left(\left[\theta_{t+1}^i - \theta_t^C\right]^2\right),$$

where  $x_t^i$  is consumption of the adult,  $w_{t+1}^i$  the wage that their child receives in  $t+1$ , and  $\theta_{t+1}^i$  denotes the values of the child. We impose the standard assumptions that  $u', v', g' > 0$ , and  $u'', v'' < 0$ . We also assume that  $g(0) = 0$  and  $g > 0$  everywhere else.

The child's value of  $\theta_{t+1}^i$  depends on the education received,  $e_t^i$ , the parent's values,  $\theta_t^i$ , and the values prevailing in the host society and promoted by the schooling system,  $\theta_t^H$ . We model  $\theta_{t+1}^i$  as a weighted sum of  $\theta_t^i$  and  $\theta_t^H$ :

$$\theta_{t+1}^i(e_t^i) = [1 - \lambda(e_t^i)] \theta_t^i + \lambda(e_t^i) \theta_t^H. \quad (2)$$

The weighting function,  $\lambda(e_t^i)$ , is assumed to satisfy

$$\lambda(0) = 0, \lambda'(e) > 0, \lambda''(e) \leq 0, \lambda(e) \leq 1 \quad \forall e \geq 0. \quad (3)$$

Thus, when community members are not exposed to education outside the community their values do not change. This assumption is consistent with findings from longitudinal studies of the children of immigrants. Furthermore, the assumption that the weight on host society values increases at a decreasing rate with education implies that primary education ( $e_t^i$  close to zero) has the strongest leverage on values. Thus, for a given a level of education, an individual will develop values closer to the community if the leverage of primary education on values is small and they are further from school norms (Akerlof and Kranton, 2002). Conversely, an individual will develop values closer to those of the host society values if the leverage of primary education on values is large (Phinney *et al.*, 2000) and they have a better initial fit with school norms (Goldin and Katz, 1997; Alesina *et al.*, 1999).

The adult in family  $i$  at time  $t$  chooses  $x_t^i$  and  $e_t^i$  to maximize their utility,  $U_t$ , subject to

$$e_t^i \geq 0 \text{ and } w(e_{t-1}^i) \geq x_t^i + c(e_t^i),$$

where  $c(e)$  is the cost of education and  $w(e)$  is the relationship between the wage and education. We assume that

$$w(0) = w_0 > 0, w' > 0, w'' \geq 0, c(0) = 0, c' > 0, c'' > 0.$$

At the optimum the budget constraint binds, and the optimal  $e_t^i$  is determined by the first-order condition along with the complementary slackness condition,

$$\begin{cases} -u'c'(e_t^i) + v'w'(e_t^i) - 2g'\lambda'(e_t^i)L(\theta_t^i, e_t^i) \leq 0, \\ e_t^i \geq 0, \end{cases} \quad (4)$$

where

$$L(\theta_t^i, e_t^i) = \left[ \left[ \theta_t^H - \theta_t^i \right] \left[ \theta_t^i - \theta_t^C \right] + \lambda(e_t^i) \left[ \theta_t^H - \theta_t^i \right]^2 \right]. \quad (5)$$

At an interior optimum the first condition becomes an equality, so the chosen level of education equalizes the marginal benefit from education to the marginal cost of education comprised of the physical cost of education and the marginal disutility from the change in the offspring's values caused by school education. When marginal cost exceeds marginal benefit at  $e_t = 0$  the optimal choice of education is zero.

It follows from the individual choice of education level that we can write

$$e_t^i = e\left(\theta_t^i, \theta_t^C, \theta_t^H\right).$$

The evolution of individual values conditional on the process  $\{\theta_t^H\}$  is then given by the  $n$  first-order difference equations

$$\theta_{t+1}^i = \left[ 1 - \lambda\left(e\left(\theta_t^i, \theta_t^C, \theta_t^H\right)\right) \right] \theta_t^i + \lambda\left(e\left(\theta_t^i, \theta_t^C, \theta_t^H\right)\right) \theta_t^H,$$

and the solutions combine to give the mean value in (1). The process  $\{\theta_t^H\}$  and the difference equations determine the dynamics of values starting from any initial position  $\{\{e_{-1}^i\}, \{\theta_0^i\}, \theta_0^H\}$ .

We consider two scenarios for the process  $\{\theta_t^H\}$ :

P1.  $\theta_t^H$  is exogenously fixed:

$$\theta_t^H = \theta^H \quad \forall t = 0, 1, \dots$$

In this scenario the values of the host society promoted by the educational system are not influenced by the community nor do they change over time.

P2.  $\theta_t^H$  evolves according to the process:

$$\theta_{t+1}^H = f\left(\theta_t^H, \theta_t^C\right).$$

This process is intended to describe a situation when the community is influential, perhaps, because of its large size or the scope of activities, so that its values affect the values of the host society.<sup>5</sup>

## 2.1 Steady state: separation and assimilation

We define a steady state of the economy as one characterized by a constant level of education across the generations in the same family, and constant community

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<sup>5</sup>The effect of relative population sizes could be modelled by extending this function.

and social values. It is now shown that there are several possible types of steady state with different implications for social structure.

The first result shows that an extreme outcome is possible in which the community remains separated from the host society. To state the result succinctly, let  $F(\theta_0^i) \equiv -u'c'(0) + v'w'(0) - 2g'\lambda'(0) [\theta_0^H - \theta_0^i] [\theta_0^i - \theta_0^C]$ .

**Lemma 1** (*Separation*) *If  $\theta_t^H$  follows process P1 and, at time 0,  $F(\theta_0^i) < 0$  for all  $i = 1, \dots, n$ , then  $e_t^i = 0$  and  $\theta_t^i = \theta_0^i$  for all  $i = 0, \dots, n$  and  $t \geq 0$ .*

The outcome described in Lemma 1 is one in which no family in the community chooses to invest in education. As a consequence the values of the families in the community remain constant from generation to generation, and remain at a constant distance from the values of the host society. This steady state represents *separation* between the community and the host society. Moreover, because no education is undertaken the incomes of the community members remain at the minimum level. The families in the community rationally make the choice to accept low living standards in order to prevent the erosion of traditional community values.

It should be noted that a necessary condition for the outcome in lemma 1 to occur is that

$$-u'c'(0) + v'w'(0) < 0,$$

because either  $\theta_0^i = \theta_0^C$  all  $i = 1, \dots, n$ , or else  $\theta_0^i - \theta_0^C < 0$  for some  $i$  and  $\theta_0^i - \theta_0^C > 0$  for some  $i$ . This shows that the outcome with separation may occur when education is prohibitively expensive, or the returns to education are low.

The result that no one in the community chooses to obtain formal education is a very strong one, and, perhaps, unlikely to be observed in practice.<sup>6</sup> It is more interesting to explore which of the families in the community will choose to obtain education in those cases where some, but not all, choose to do so. In what follows we choose the index for the community members so that  $\theta_0^1 \leq \theta_0^2 \leq \dots \leq \theta_0^n$ , and define the measure for  $\theta$  such that it gives the order  $\theta_0^C \leq \theta_0^n < \theta_0^H$ . We then define

$$\theta^* = \frac{\theta_0^H + \theta_0^C}{2}.$$

**Lemma 2** *If  $F(\theta^*) < 0$  and  $e_0^i > 0$  for any  $i$ , then  $e_0^1 > 0$  and/or  $e_0^n > 0$ .*

Lemma 2 shows that the community families choosing to educate their children will be drawn from those farthest from the community value on either side, that is, those *farthest from both* the community and the society, and those

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<sup>6</sup>The closest well-documented example to this outcome are the Amish communities in the United States. The Amish are one of the most conservative religious sects in America. They teach their children in their own schools up to the eighth grade level and do not encourage education above this level: "The Amish feel that a child who achieves a level of scholarship beyond the fundamentals of the primary grades is likely to leave the community and be lost to the church. More importantly, if a child spends the great part of his day at the high school, there is less chance he will learn to appreciate the Amish way of life." (Knudsen, 1974.)



*farthest* from the community but *closest* to the society value. One group choose education so that their children move closer to the community value, while the other group are educated because they are already close to the society value so do not suffer a significant utility loss from the socializing effect of education. Surprisingly, the families at the core of community, or the representatives of community values, will be those who do not choose education. The continuation of the process from period 1 onward is hard to pin down since the value of  $\{\theta_t^C\}$  cannot be tracked without further details on the education choices. However, no matter how  $\theta_t^C$  evolves the families choosing education will be drawn from one or both ends of the value distribution.

Modifying slightly the conditions of the previous argument provides an interesting case for which it is possible to describe the initial change in  $\theta_t^C$ . Assume that  $F(\theta^*) < 0$  for all  $i$  with  $\theta_0^i \geq \theta^*$ , and  $F(\theta_0^1) > 0$ . Then there will be some value  $\hat{\theta}$ ,  $\hat{\theta} < \theta^*$ , such that  $F(\hat{\theta}) = 0$ . Now partition the set of individuals into the sets  $C^1 \equiv \{i : \theta_0^i < \hat{\theta}\}$  and  $C^2 \equiv \{i : \hat{\theta} \leq \theta_0^i\}$ . The monotonicity of  $F(\theta_0^i)$  implies that for all  $i \in C^1$  we have  $e_0^i > 0$ , so that  $\theta_1^i > \theta_0^i$ . Similarly, for all  $i \in C^2$  we have  $e_0^i = 0$  so  $\theta_1^i = \theta_0^i$ . These choices of education levels imply that  $\theta_0^C = \frac{1}{n} \sum \theta_0^i < \frac{1}{n} \sum \theta_1^i = \theta_1^C$ . It is now observed that the position at time 1 looks just like that at time 0. Two outcomes can then occur.

(i) The first possibility is that the increase in  $\theta_t^C$  from  $\theta_0^C$  to  $\theta_1^C$  may result in  $F(\theta_0^n) > 0$ . The families with values closest to the social value will then enter education because the loss from moving further from community values is reduced. The situation then mirrors that of lemma 2.

(ii) The second possibility is that the movement in values of the community families with  $\theta_t^i < \theta_t^C$  will eventually cause them to withdraw from education. Hence, education may initially be chosen by some of the community but then the community withdraws from education. Partial education initially can lead to an ultimate outcome of separation.

The next set of results are built on the assumption that all families in the community choose education so that  $e_t^i > 0$  for all  $i = 0, \dots, n$  and all  $t$ . Define  $\theta_t^*$  by

$$\theta_t^* = \frac{\theta_t^C + [1 - 2\lambda(e_t^i)] \theta_t^H}{2[1 - \lambda(e_t^i)]}.$$

It is then possible to characterize how the choice of education level depends on family values  $\theta_t^i$ .

**Lemma 3** *At time  $t$  the level of education  $e_t^i = e(\theta_t^i; \theta_t^C, \theta_t^H)$  is strictly decreasing in  $\theta_t^i$  for  $\theta_t^i < \theta_t^*$  and strictly increasing in  $\theta_t^i$  for  $\theta_t^i > \theta_t^*$ .*

The next lemma shows that if society values are constant, or always adjust towards the community values, there will be monotonicity over time in the mean level of community values over time and convergence of society and community values.

**Lemma 4** (i) If process P1 applies (so  $\theta_t^H = \theta^H$ ) then  $\left\{ \left( \theta^H - \theta_t^C \right) \right\}$  is a decreasing sequence,  $\left\{ \theta_t^C \right\}$  is an increasing sequence, and  $\left\{ e(\theta_t^*; \theta_t^C, \theta^H) \right\}$  is an increasing sequence. (ii) If process P2 applies (so  $\left| \theta_t^H - \theta_t^C \right| < f \left( \left| \theta_t^H - \theta_t^C \right| \right)$ ) then  $\left\{ \theta^H - \theta_t^C \right\}$  is a decreasing sequence,  $\left\{ \theta_t^C \right\}$  is an increasing sequence, and  $\left\{ e(\theta_t^*; \theta_t^C, \theta^H) \right\}$  is an increasing sequence.

The results in lemma 4 show that the lowest level of formal schooling that might be chosen at time  $t$  increases over time. In addition, for any value of  $\theta_t^i$  the value of  $L(\theta_t^i, e_t^i)$  is decreasing in  $\theta_t^C$ . This causes an increase in education at every level of  $\theta$ . It should be made clear that this result does not determine the change over time of the level of education,  $e_t^i$ , because the value of  $\theta_t^i$  also changes for each family. For some families (generally, those with the lowest  $\theta_t^i$ ) these changes will be offsetting.

The main theorem of this section provides a description of the steady state when a positive level of education is chosen by each generation.

**Theorem 1** At a steady state with  $\hat{e}_t^i > 0$  for all  $i = 1, \dots, n$ , it must be the case that  $\hat{e}_t^i = \hat{e} > 0$  and  $\hat{\theta}^i = \hat{\theta}$  all  $i = 1, \dots, n$ , and  $\hat{\theta}^H = \hat{\theta}^C = \hat{\theta}$ .

The result described in Theorem 1 describes two alternative outcomes dependent on the process for social values. If  $\theta_t^H$  is fixed then the steady state involves *assimilation* because the values of the community change with education until they eventually become equal to the (unchanging) values of the society. Alternatively, if  $\theta_t^H$  follows an adaptation process then the steady state is a *melting pot* with convergence of community and social values to a common final value with  $\hat{\theta} \in (\theta_0^C, \theta_0^H)$ .

From (10) we have that in any steady state with  $\hat{e} > 0$  the level of education solves

$$v'w'(\hat{e}) = u'c'(\hat{e}). \quad (6)$$

Since  $v'' < 0$ ,  $w'' > 0$ ,  $u'' < 0$ , and  $c'' > 0$ , this equation may have more than one solution, and different solutions can have different local and global stability properties. Each solution will be a steady-state level of education,  $\hat{e}$ . Note that this condition (6) does not contain  $f$  and  $\lambda$ , and therefore the level of  $\hat{e}$  is independent of the process of adjustment. Since the community and social values are equalized it follows that  $\hat{\theta}^C - \hat{\theta}^H = 0$ . However, the level of the common values  $\hat{\theta}$  achieved in the steady state depends on how fast the the community's and the host society's values change, and therefore does depend upon  $f$  and  $\lambda$ . Under Scenario 1 for  $\theta_t^H$  the unique steady state value of  $\hat{\theta}^C$  is  $\theta^H$  for all steady state levels of  $\hat{e}$ . Under Scenario 2 for  $\theta_t^H$  each steady state value of  $\hat{e}$  may have its own steady state value of  $\hat{\theta}^C$ .

If there are multiple steady states they are characterized by the different levels of education that obtained. The next theorem shows that the steady-state equilibria can be Pareto ranked.

**Theorem 2** *For any two steady state levels of education  $\hat{e}_1$  and  $\hat{e}_2$ , with  $\hat{e}_1 < \hat{e}_2$ ,  $W(\hat{e}_1) < W(\hat{e}_2)$ .*

## 2.2 Transition paths

In section 2.1 we characterized potential steady-state equilibria of the dynamic process determining values. For a policy analysis it is not just the steady state that matters. The period of transition to the steady state may be long so that it becomes important to investigate the path that the society follows to reach the steady state. In this section we investigate an example in more details using specific functional forms for preferences and for the weighting function. The example isolates the factors which determine when the community may become isolated and locked in a poverty trap, or, conversely, becomes integrated into the host society. It also characterizes when unique or multiple equilibria occur.

For the example we assume the following functional forms:

$$\begin{aligned} U_t^i &= \ln(x_t^i) + \beta \ln(w_{t+1}^i) - \frac{q}{2} [\theta_{t+1}^i - \theta_t^i]^2, \\ \lambda(e_t^i) &= ae_t^i - \frac{b}{2} [e_t^i]^2, \\ c(e_t^i) &= re_t^i + \frac{p}{2} [e_t^i]^2, \\ w_{t+1}^i &= w_0 \exp(\rho e_t^i), \end{aligned}$$

where  $a, b, p, q, r, \beta, \rho$  are non-negative constants. In particular, we assume that the values of  $a$  and  $b$  are chosen such that assumption (3) holds everywhere along the path and in the steady state. The parameter  $q$  measures the importance of deviation of child's value from the community value. In the analysis this is assumed to be constant across individuals.<sup>7</sup> Parameter  $a$  in the weighting function  $\lambda$  captures the leverage of primary education on values (thus smaller magnitudes of  $a$  correspond to higher segregation), whilst parameter  $b$  represents how fast the impact of school norms on students' values weakens at higher levels of education.

The evolution of the value of the host society is assumed to be given by

$$\theta_{t+1}^H = \theta_t^H - c(\theta_t^H - \theta_t^C) + d \frac{(\theta_t^H - \theta_t^C)^2}{2\theta_t^H}, \quad (7)$$

where process P1 applies if  $c = d = 0$  and P2 applies otherwise. Note that the evolution of  $\theta_t^H$  can be re-written as

$$\frac{\theta_{t+1}^H - \theta_t^H}{\theta_t^H} = -\frac{\theta_t^H - \theta_t^C}{\theta_t^H} \left[ c - \frac{d}{2} \frac{\theta_t^H - \theta_t^C}{\theta_t^H} \right],$$

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<sup>7</sup>In the simulations we allow this parameter to vary by assuming that each family is characterized by its own value of  $q$ , drawn randomly from a uniform distribution.

which shows that it describes either partial adjustment at a diminishing rate or divergence at an increasing rate.

With these functional forms the evolution of the economy is described by the system involving (7) and

$$\begin{aligned}\theta_{t+1}^i &= \left(1 - ae_t + \frac{b}{2}e_t^2\right)\theta_t^i + \left(ae_t - \frac{b}{2}e_t^2\right)\theta_t^H, \\ e_t^i &= \max\{0, \tilde{e}\},\end{aligned}$$

with  $\tilde{e}$  defined as the solution to

$$\begin{aligned}\beta\rho &= \frac{r + p\tilde{e}}{w_0 \exp(\rho e_{t-1}^i) - r\tilde{e} - p\tilde{e}^2/2} \\ &+ q \left[ \left(a\tilde{e} - \frac{b}{2}\tilde{e}^2\right) (\theta_t^H - \theta_t^C) + \theta_t^i - \theta_t^C \right] (a - b\tilde{e}) (\theta_t^H - \theta_t^C).\end{aligned}$$

The solution describes the dynamics of the values of the community, given the initial conditions  $\{\{e_{-1}^i\}, \{\theta_0^i\}, \theta_0^H\}$ .

One can see that in this economy the steady state described in lemma 1 with  $e_t = e_0 = 0$  may exist for process P1 when the preferences are such that  $\beta$  is small (parents put low weight on their children's welfare) or  $q$  is large (the parents' discontent with the change in children's values is strong). It is more likely to happen when  $\rho$  is small (low return to education),  $r$  and/or  $p$  are large (the cost of education is high), or  $a$  is large (the effect of schooling on values is strong), or when  $(\theta_0^H - \theta_0^C)$  is large (the initial gap between the values of the community and those of the host society is wide).

The outcome under process P2 with adjustment can be very different from that for process P1. Given the same configuration of parameters, when the host society adjusts its values toward the community it is possible that the gap between their values shrinks from  $t = 0$  to  $t = 1$ . Thus, in conformity with lemma 4, given  $\theta_1^C = \theta_0^C$  when  $e_0 = 0$  is chosen, is it easy to obtain the condition

$$\frac{\theta_1^H - \theta_1^C}{\theta_0^H - \theta_0^C} < 1 \text{ if } \frac{1 - c}{d/2} < \frac{\theta_0^H - \theta_0^C}{\theta_0^H} < \frac{c}{d/2}.$$

With a sufficient reduction in the distance between the values it may become optimal for the next generation of parents to choose  $e_1 > 0$ . In the next period the gap will shrink even more as  $\theta_2^H$  approaches  $\theta_2^C$ , which in turn induces higher  $e_2$ , and so forth. The process of convergence may, however, reverse, in particular, if the strength of value transmission at school weakens significantly at higher levels of education ( $b$  is sufficiently large relative to  $a$ ). Thus, the outcome depends on both the schooling effect and the degree of adjustment of the host society to the community.

We now briefly analyze the existence of a steady state and the welfare implications of multiplicity of the steady states for this economy, assuming that

the community members have identical preferences, so that  $\theta_t^C = \theta_t$ . Using the chosen functional forms we can rewrite (6) as

$$\frac{v'(w(\hat{e}))}{u'(w(\hat{e}) - c(\hat{e}))} w'(\hat{e}) = c'(\hat{e}),$$

or

$$w_0 \exp(\rho \hat{e}) = \frac{r}{\beta \rho} + \left( \frac{p}{\beta \rho} + r \right) \hat{e} + \frac{p}{2} \hat{e}^2, \quad (8)$$

where  $\hat{e}$  is the steady state level of education. Both sides of the equation are strictly increasing and convex in  $\hat{e}$ . It is easy to see that three different cases are possible:

- (i) There is no solution if  $w_0 > \max \left\{ \frac{r}{\beta \rho}, \frac{r}{\rho} + \frac{p}{\beta \rho^2} \right\}$ ;
- (ii) There is a unique solution if  $\frac{r}{p} > \frac{1}{(1-\beta)\rho}$  (this ensures  $\frac{r}{\beta \rho} > \frac{r}{\rho} + \frac{p}{\beta \rho^2}$ ) and  $\frac{r}{\rho} + \frac{p}{\beta \rho^2} < w_0 < \frac{r}{\beta \rho}$ ;
- (iii) There are two solutions if  $\frac{r}{p} < \frac{1}{(1-\beta)\rho}$  and  $\frac{r}{\beta \rho} < w_0 < \frac{r}{\rho} + \frac{p}{\beta \rho^2}$ .

There are also knife-edge situations when  $w_0 = r/(\beta \rho)$  or  $w_0 = r/(\rho) + p/(\beta \rho^2)$  but these are of lesser interest. In case (iii) the two steady states are characterized by different levels of education.

The local stability property of a steady state, when it exists, is characterized in the following theorem.

**Theorem 3** *If a steady state with strictly positive education  $\hat{e}$  exists then it is locally stable if and only if*

$$\hat{e} < \frac{1 - \beta(1 + r\rho)}{\beta r \rho} \left[ 1 + \sqrt{1 + \frac{p\beta[p + r\rho(1 - \beta)]}{[1 - \beta(1 + r\rho)]^2}} \right].$$

### 3 Simulation results

In this section we present the results of simulations of the model with a heterogeneous community ( $q$  is drawn from a uniform distribution<sup>8</sup>) for different combinations of the magnitudes of the model parameters. The simulations are used to discuss alternative outcomes with respect to integration, as well as how the outcome can be influenced by policy.

<sup>8</sup>We also ran simulations for a heterogeneous community with different levels of education in the first generation, drawn from a uniform distribution. The results differ only in levels, while the shapes of the paths are essentially the same.

On the graphs in figures 1 and 2 we plot the choice of education, the resulting shifts in the values of the community (blue lines) and the host society (red lines) over time, and the path of welfare. Our simulations for various configurations of parameter values appear to result robustly in a number of different scenarios, some of which are illustrated in the figures below, as the most interesting representative cases. In all simulations presented in this section we use  $w_0 = 1$ ,  $\rho = 0.25$ ,  $p = 0.2$ ,  $r = 0.1$ ,  $\theta_0^H = 3$ ,  $\theta_0^C = 1$ ,  $e_0 = 0$ ,  $\beta = 0.75$ ,  $c = 0.1$ .

Figure 1 reports simulations for two different values of  $b$  (which captures the fall in effectiveness of value transmission at higher levels of education) under the assumption that  $E[q] = 0.1$ . Figure 2 considers two values of  $d$  (the rate of adjustment of the host society toward the community) with  $E[q] = 0.5$  so the average disutility from the future deviation of children's value from the parents' values is higher for figure 1. Contrasting the figures, it is clear that in the second case, which can be described as a community that is more conservative, the parent's choice of education for their child is substantially lower than in the first case. Consequently, the values in the community do not change much over time.

In Figure 1 the solid curves correspond to  $a = 1/3$  and  $b = 9/5$ , and the dashed curves correspond to  $a = 1/3$  and  $b = 2/3$ ; in both cases  $d = 0.5$ . The choice of education is higher in the second case, but the difference between the two cases is relatively small. The shifts in the values, however, are very different: in the first case, characterized by a higher  $b$ , the values of the community and the host society diverge, while in the second case the gap between values shrinks over time. Thus, the first situation describes a community that is well-educated but is immune to the effects of the outside culture and is not willing to integrate into the host society; this attitude causes the initial trend in the host values towards the community to eventually reverse. The realized dynamic path of the host society value is non-monotone: the host society make steps towards integration but then diverges from the community. As the community is alienated from the host society, the latter distances itself from the community even more. In the second case, when the effect of schooling diminishes slowly, the gradual shift of community values towards the host society is met by a reciprocal shift in the host society values. The gap between values eventually shrinks: the two cultures embrace each other. The welfare of the community is higher in the second case, primarily because of the smaller loss of utility due to the more gradual change in values.

The solid lines in figure 2 correspond to  $d = 0.5$  and the dashed lines to  $d = 0.25$ . The higher value of  $d$  in the first case means that the host society is less willing to accommodate the community when the difference in values is large relative to the first case with lower  $d$ . (In both cases we used  $a = 4/3$  and  $b = 2/3$ , so that the effect of schooling does not diminish very much as the amount of education increases.) It can be seen that in the first case the distance between the community and the host society increases over time, while education remains at a rather low level. This is because the disutility from changing values is relatively low, so the community moves towards the host society. However, at the same time the society moves away from the community. This describes

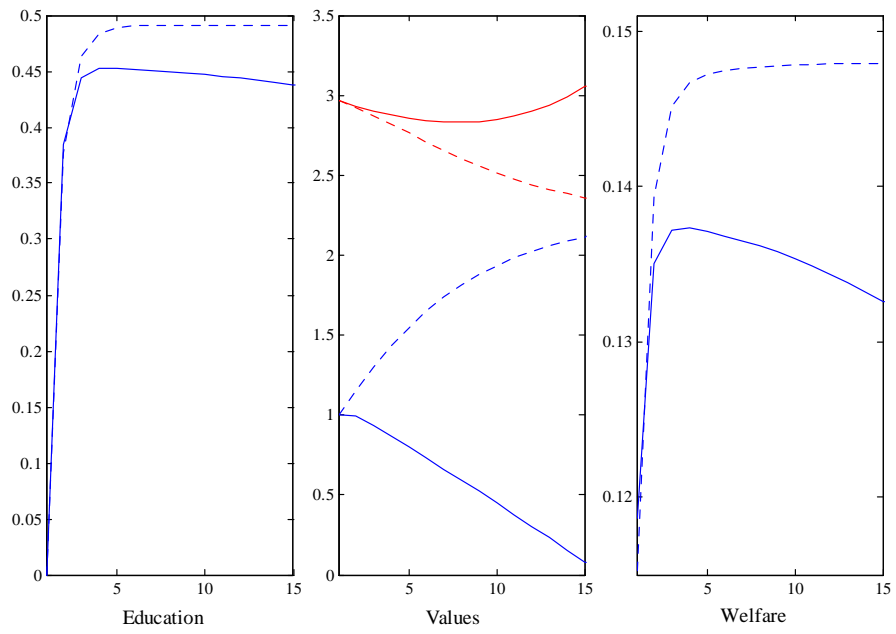


Figure 1: Affluent isolation or affluent melting pot?

a low-skilled community trying to imitate and become integrated into the host culture, while the schooling system, or, indeed, the host society continues to emphasize the difference and maintains, or even increases, the distance from the community. In the second case the host society adjusts to the community, and both the educational outcomes and welfare are strikingly higher – the latter not only due to the higher earnings, but also because with the adjusting host society its values, instilled in children through schooling, are now closer to the community values and so do not cause discontent to the parents. This describes the situation when the willingness of the host society to embrace the values of the community is reinforced by the willingness of the community to adjust.

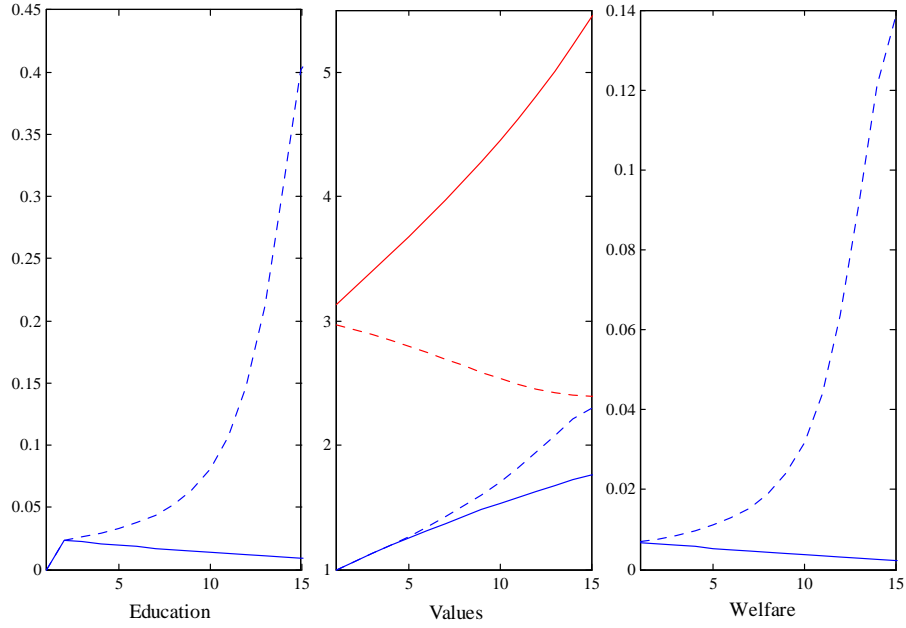


Figure 2: Deprived isolation or affluent melting pot?

Although the model provide only a simple representation of the relationship between values and education it is capable of generating a variety of different scenarios of cultural integration or segregation of minority groups. These scenarios are characterized by different patterns of human capital accumulation and welfare. The outcomes for the community under these scenarios are summarized in Table 1.



Parameters	high $d$ , low $q$	high $d$ , high $q$	low $d$ , high $q$
high $b$	high-skill, reclusive	high-skill, integrated	high-skill, reclusive
low $b$	high-skill, integrated	low-skill, rejected	high-skill, integrated

Table 1: Simulation outcomes

## 4 Conclusions

This paper has presented a model of the transmission of values across generations and communities and of the effect that different education and integration attitudes can have on the welfare of communities, as well as on cultural integration. We have characterized alternative steady states and, using simulations, have compared educational and socioeconomic outcomes in different scenarios generated by the different relative importance attributed by parents to their traditional values and to their children’s future earnings, as well as different school norms.

The analysis has investigated both the dynamics of the process of value adjustment and the steady state of the process. It is possible for a steady state with separation to arise. In such a case the community gives such importance to values that its members prefer not to engage in education in order to prevent any change in the traditional values. The community essentially isolates itself from the host society. This steady state only arises under strong assumptions. If there is dispersion of values within the community then some may choose education for two distinct motives. Those with values far from those of the community, and even further from society, will choose education to move their children’s values closer to community values. Conversely, those with values closest to society will be more concerned with the increase in children’s income than with the change in values. If all members of the community choose education then all steady states must involve the values of the community becoming equal to the values of society. This can be achieved through assimilation or convergence.

Policies to reduce segregation in communities through schooling appear to be effective in raising the educational attainment of immigrants’ children in the long run and a discussion of the role of institutional and social capital in migrants’ integration and well-being can be found in Della Giusta and Kambhampati (2006). Our simulations demonstrate that community values adjust and eventually converge to society values only if segregation is relatively low and the fit between students and school norms is relatively high. The model is necessarily simple compared to the complex reality of minority communities but it permits different evolutions of individual values and their effect on broader community outcomes and reveals why social inclusion is not always attained.

## Appendix

### Proof of Lemma 1

Observe that when  $e_{-1}^i = 0$ ,  $\theta_1^i(0) = [1 - \lambda(0)]\theta_0^i + \lambda(0)\theta_0^H = \theta_0^i$ . Substituting this into (4) shows that  $F(\theta_0^i) < 0$  implies  $e_0^i = 0$ ,  $\forall i$ . From the adjustment process (2) it follows that  $\theta_1^i = \theta_0^i$ . Hence,  $F(\theta_1^i) = F(\theta_0^i) < 0$  and  $e_1^i = 0 \forall i$ . Iterating the argument shows  $F(\theta_{t+1}^i) = F(\theta_t^i) < 0 \forall i, t$ .

### Proof of Lemma 2

By definition,  $\theta^*$  maximizes  $2g'\lambda'(0)[\theta_0^H - \theta_0^i][\theta_0^i - \theta_0^C]$ . Since  $F(\theta_0^i)$  is continuous in  $\theta_0^i$  there will an interval  $I^*$  around  $\theta^*$  such that  $F(\theta_0^i) < 0$  for  $\theta_0^i \in I^*$ . For all  $i$  such that  $\theta_0^i \in I^*$  it follows that  $e_0^i = 0$ . Furthermore,  $2g'\lambda'(0)[\theta_0^H - \theta_0^i][\theta_0^i - \theta_0^C]$  is monotonically increasing in  $i$  if  $\theta_0^i < \theta^*$ , and monotonically decreasing in  $i$  if  $\theta_0^i > \theta^*$ . Hence, if  $F(\theta_0^1) > 0$  there will be a connected interval  $I^L = [\theta_0^1, \theta_0^L]$  such that  $e_0^i > 0$  if  $\theta_0^i \in I^L$ . Alternatively, if  $F(\theta_0^n) > 0$  there will be a connected interval  $I^R = [\theta_0^R, \theta_0^n]$  such that  $e_0^i > 0$  if  $\theta_0^i \in I^R$ .

### Proof of Lemma 3

The first-order condition for the interior educational choice at time  $t$  is

$$-u'c'(e_t^i) + v'w'(e_t^i) - 2g'\lambda'(e_t^i)L(\theta_t^i, e_t^i) = 0, \quad (9)$$

where  $L(\theta_t^i, e_t^i)$  is defined in (5). Observe that  $L(\theta_t^i, e_t^i)$  has a maximum at

$$\theta_t^* = \frac{\theta_t^C + [1 - 2\lambda(e_t^i)]\theta_t^H}{2[1 - \lambda(e_t^i)]},$$

and at this maximum

$$L(\theta_t^*, e_t^i) = \frac{[\theta_t^H - \theta_t^C]^2}{4[1 - \lambda(e_t^i)]} > 0.$$

Furthermore,  $L(\theta_t^i, e_t^i)$  is strictly increasing in  $\theta_t^i$  for  $\theta_t^i < \theta_t^*$ , strictly decreasing in  $\theta_t^i$  for  $\theta_t^i > \theta_t^*$ , and, since  $\lambda'(e_t^i) > 0$ ,  $L(\theta_t^i, e_t^i)$  is strictly increasing in  $e_t^i$ . These properties of  $L(\theta_t^i, e_t^i)$  imply the claims for  $e(\theta_t^i; \theta_t^C, \theta_t^H)$ .

### Proof of Lemma 4

(i) From (2) and the fact that  $e_t^i > 0$  it follows that  $|\theta^H - \theta_{t+1}^i| < |\theta^H - \theta_t^i|$  for all  $i$ . In addition,  $\theta_{t+1}^C > \theta_t^C$  and that  $\theta_{t+1}^* > \theta_t^*$ . These observations demonstrate

the first two statements. By definition

$$L(\theta_t^*, e) = \frac{[\theta^H - \theta_t^C]^2}{4[1 - \lambda(e)]} > 0.$$

But since  $\theta_{t+1}^C > \theta_t^C$  it follows that

$$L(\theta_{t+1}^*, e) < L(\theta_t^*, e)$$

for all  $e$ . As a consequence  $e(\theta_{t+1}^*; \theta_{t+1}^C, \theta^H) > e(\theta_t^*; \theta_t^C, \theta^H)$  and the lowest chosen level of formal education (over  $\theta$  at time  $t$ ) is increasing over time. The proof extends obviously to (ii).

### Proof of Theorem 1

The community members have identical preferences. Therefore, in a steady state with a positive level of education,  $e_t^i = \hat{e} > 0$ . The values of  $\hat{e}$ ,  $\hat{\theta}^C$ , and  $\hat{\theta}^H$  will satisfy

$$v' w'(\hat{e}) = u' c'(\hat{e}) - 2g' \lambda'(\hat{e}) [\hat{\theta}^C - \hat{\theta}^H]^2 \lambda(\hat{e}), \quad (10)$$

and

$$\hat{\theta}^C = \left[1 - \lambda\left(e\left(\hat{\theta}^C, \hat{\theta}^H\right)\right)\right] \hat{\theta}^C + \lambda\left(e\left(\hat{\theta}^C, \hat{\theta}^H\right)\right) \hat{\theta}^H. \quad (11)$$

### Proof of Theorem 2

The steady state level of utility is given by

$$W(\hat{e}) = u(w(\hat{e}) - c(\hat{e})) + v(w(\hat{e})).$$

Differentiation with respect to  $\hat{e}$  gives

$$\begin{aligned} W'(\hat{e}) &= u'(w(\hat{e}) - c(\hat{e})) [w'(\hat{e}) - c'(\hat{e})] + v'(w(\hat{e})) w'(\hat{e}) \\ &= u'(w(\hat{e}) - c(\hat{e})) w'(\hat{e}) > 0. \end{aligned}$$

This establishes the result.

### Proof of Theorem 3

The local stability of a given steady state is determined by the magnitude of  $de_t/de_{t-1}$  at the point  $e_t = e_{t-1} = \hat{e}$ . Straightforward calculations give

$$\begin{aligned} \left. \frac{de_t}{de_{t-1}} \right|_{e^*} &= \frac{w'(\hat{e})}{c'(\hat{e}) + \frac{p}{\beta\rho}} = \frac{\rho w(\hat{e})}{c'(\hat{e}) + \frac{p}{\beta\rho}} \\ &= \frac{\rho \left[ c(\hat{e}) + \frac{c'(\hat{e})}{\beta\rho} \right]}{c'(\hat{e}) + \frac{p}{\beta\rho}}, \end{aligned}$$

where the last equality follows from (8). The steady state is locally stable when this quantity is between zero and one; for this to be the case  $\beta$  has to be sufficiently large,  $\rho$  sufficiently small, and  $\frac{p}{\beta\rho}$  sufficiently small. The stability condition can be rewritten as

$$\beta p \rho \hat{e}^2 - 2[1 - \beta(1 + r\rho)]\hat{e} - \frac{p}{\rho} - r(1 - \beta) < 0. \quad (12)$$

The discriminant of the quadratic polynomial in  $\hat{e}$  in (12) is given by

$$\frac{D}{4} = [1 - \beta(1 + r\rho)]^2 + \beta p[p + r\rho(1 - \beta)] > 0,$$

assuming  $\beta < 1$ . Therefore, the polynomial in (12) has two real-valued roots, and the inequality in (12) holds for  $\hat{e} \in (e^-, e^+)$ , where

$$e^\pm = \frac{[1 - \beta(1 + r\rho)] \pm \sqrt{[1 - \beta(1 + r\rho)]^2 + \beta p[p + r\rho(1 - \beta)]}}{\beta p \rho}.$$

Clearly,  $e^+ > 0$  and  $e^- < 0$ , and so the steady state with  $\hat{e} < e^+$  is locally stable, whereas the steady state with  $\hat{e} > e^+$  is locally unstable.

## References

- Akerlof, G. (1980) “A theory of social custom - of which unemployment may be one consequence”, *Quarterly Journal of Economics*, **94**, 749 – 775.
- Akerlof, G.A. and R.E. Kranton (2000) “Economics and identity”, *Quarterly Journal of Economics*, **115**, 715 – 753
- Akerlof, G.A. and R.E. Kranton (2002) “Identity and schooling: Some lessons for the economics of education”, *Journal of Economic Literature*, **40**, 1167 – 1201
- Aydemir, A., W. Chen and M. Corak (2009) “Intergenerational earnings mobility among the children of Canadian immigrants”, *Review of Economics and Statistics*, **91**, 377 – 397
- Aydemir, A., W. Chen and M. Corak (2013) “Intergenerational education mobility among the children of Canadian immigrants”, *Canadian Public Policy*, **39**, 107 – 122.
- Bisin, A. and T. Verdier (2001) “The economics of cultural transmission and the dynamics of preferences”, *Journal of Economic Theory*, **97**, 298 – 319.
- Blau, F., L.M. Khan, A.Y.Liu and K.L. Papps (2013) “The transmission of women’s fertility, human capital and work orientation across immigrant generations”, *Journal of Population Economics*, **26**, 405 – 435.

- Constant, A.F., L. Gataullina and K.F. Zimmerman (2009) "Ethnosizing immigrants", *Journal of Economic Behavior and Organization*, **69**, 274 – 287.
- Corak, M. (2004) (Ed.) *Generational Income Mobility in North America and Europe*, Cambridge: Cambridge University Press.
- Corneo, G. and O. Jeanne (2009) "A theory of tolerance", *Journal of Public Economics*, **93**, 691 – 702.
- Corneo, G. and O. Jeanne (2010) "Symbolic values, occupational choice, and economic development", *European Economic Review*, **54**, 237 – 251.
- Dasgupta, I. and R. Kanbur (2005) "Bridging communal divides: separation, patronage, integration", in: Barrett C.B. (Ed.), *The Social Economics of Poverty*, 146 – 170, Routledge: London, New York
- Dasgupta, I. and R. Kanbur (2007) "Community and class antagonism", *Journal of Public Economics*, **91**, 1816 – 1842
- Della Giusta, M and U.S. Kambhampati (2006) "Women migrant workers in the UK: social capital, well-being and integration", *Journal of International Development*, **18**, 819 – 833.
- Jones, Steven R.G. (1984) *The Economics of Conformism*, Basil Blackwell: Oxford.
- Knudsen, S.T. (1974) "The education of the Amish child", *California Law Review*, **65**, 1506–1531.
- Patel, N., T.G. Powert and N.P. Bhavnagri (1996) "Socialization values and practices of Indian immigrant parents", *Child Development*, **67**, 302 – 313
- Phinney, J.S., A. Ong and T. Madden (2000) "Cultural values and intergenerational value discrepancies in immigrant and non-immigrant families", *Child Development*, **1**, 528 – 539.
- Reese, L. (2001) "Morality and identity in Mexican immigrant parents' visions of the future", *Journal of Ethnic and Migration Studies*, **27**, 455 – 472.
- Saez-Marti, M. and A. Sjogren (2008) "Peers and culture", *Scandinavian Journal of Economics*, **110**, 73 – 92.